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| Did you hear about the guy who had a balloon where his skull was supposed to be? I heard he was a bit of an airhead. ( –D.S.) | | | |
| **David Sheps, Efi Palvanov** | | | |
| **SCH3U Gases and Atmospheric Chemistry LESSON: Exploring Kinetic Molecular Theory** | | | |
| **BIG IDEAS**:  Kinetic Molecular Theory is a set of postulates that help us qualitatively and quantitatively understand and describe the properties and mechanics of gases.  **Big Question:**  What are gases as compared to other states of matter and how can we use Kinetic Molecular Theory to describe them? | | **MATERIALS**:  See Appendix 1 for a list of materials for Teaching Kinetic Molecular Theory Outside!   * Rope & Pylons * Whistle (if you don’t want to yell) * Chart Paper or Bristol Board and markers * Good weather * ENERGY!! | |
| **MINISTRY EXPECTATIONS**:  SCH3U: Gases and Atmos..: Understanding Basic Concepts  F3.2 Describe the different states of matter and explain their differences in terms of the forces between atoms, molecules and ions.  F3.3 Use the Kinetic Molecular Theory to explain property and behaviour of gasses in terms of types and degrees of molecular motion | |
| **STUDENT LEARNING GOALS**:   * -Learn how molecular theory explains the properties of different states of matter. * -Be able to describe and apply Kinetic Molecular Theory * -Be able to create and apply real-life analogies for abstract chemistry concepts * -Understand how KMT helps us describe and explain gasses * -Be able to consider and suggest some potential applications of this knowledge | | **APPENDICES**  Appendix 1: Lesson Notes  Appendix 2: Kinetic Molecular Theory – Outside!  Appendix 3: Tying it Together – Handout  Appendix 4: Tying it Together –Handout ANSWERS | |
| **PRIOR KNOWLEDGE:**  - All matter is composed of tiny particles called atoms, which are in constant motion.  -Gas is one of the three states of matter, and is made of tiny particles in constant motion. | |
|  | **T/L STRATEGIES** | **RATIONALE** | **ASSESSMENT** |
| **A MINDS ON**  (5 min intro to today’s activities + 5 min) | **A Brief outline of states of matter**  Very short recap of previous knowledge, involving a question-answer element to remind students of the different states of matter and explain why they exist how they do.  **Appendix 1** | Make sure that previous knowledge is reviewed and that all students are on the same page. Introduce some new understanding of how states of matter are based on the interaction of molecules. Question and answer will allow a view of student comprehension. | During explanation of states of matter, probing questions will be asked of the students to test their knowledge, critical thinking skills, and improve their understanding. (Assessment FOR learning) |
| **B ACTION**  (45 min, includes time to go outside and come back inside)  (One activity, but it’s a BIG one) | **Kinetic Molecular Theory -Outside!**  Student will go outside and behave as gas particles, exploring the kinetic molecular theory from the viewpoint of the gas itself! Sure to be lots of fun!  **Appendix 2** | Gets students involved with the theory learned in the classroom. Give them a real connection to the material. Get students active and physical. Get students having fun while learning chemistry | Periodically ask students during the activity to describe what they are doing and how it relates to KMT. Get students to refine their model as they refine their understanding. Questioning while outside is the primary means of assessment (FOR learning) |
| **CONSOLIDATION & CONNECTION**  (10 min) | **Tying it Together Handout**  -Students fill in handout and take it up as a class  -Introduce the term ‘ideal gas’  **Appendix 3** | Students make connections on paper between the activities done outside, and the postulates covered | Take up as a class. Have students edit as necessary. Students can demonstrate learning by suggesting alternative models. |
| **NEXT STEPS**  (5 min) | Connect the model to further concepts. What would happen to our model outside if we had a smaller space? What if I made it really hot there, would you move faster?  In what ways can we measure different aspects of gases? (lead to volume/pressure/temp) | Students will learn the connections between the activity they experienced firsthand and further learning in the course. Hopefully they will be able to use this metaphor for further principles. | Discuss these questions as a class, try to refine student understanding via assessment FOR learning questions. Get students to suggest improvements to our previous model – use assessment AS learning to develop critical thinking. |
| **HOMEWORK** | Think of why we might want to use an ideal gas as opposed to a real gas  What are some real-life applications of knowledge about gases. | Open ended questions to allow students to think creatively and consider chem in everyday life | Take it up the next class (class discussion) |